

# Hedging instruments in emerging market economies

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## Introduction

The financial crises of the 1990s in many emerging market economies (EMEs) created massive disruption and imposed huge costs of lost output on these economies.<sup>1</sup> One lesson was that these crises were particularly painful because local firms and households had to face large exchange rate or interest rate risk, with inadequate hedging possibilities. At the same time, even the massive undervaluation of local assets failed to attract foreign investors because markets were very illiquid or because it was difficult to hedge certain market risks. For these reasons, the potential benefits of global financial market integration – eg funding for profitable activities and risk-sharing – were not fully exploited.

Over the past few years, however, the size and scope of markets for hedging have expanded. The development of bond and spot foreign exchange (FX) markets and derivative products has helped advance the hedging process. The notional amounts outstanding globally of over-the-counter (OTC) derivatives have grown at an annual rate of 25% since 1998. EMEs account for 12% of this global derivatives market.<sup>2</sup> This allows business in EMEs to hedge against various risks; at the same time it also makes it easier for foreign investors to acquire exposure to specific EME risks. The purpose of this note is to examine the extent and nature of developments in derivative instruments in three main risks (namely, foreign exchange, interest rate and credit) in EMEs.

## Hedging and financial markets

Hedging is defined here as risk trading carried out in financial markets. Businesses do not want market-wide risk considerations – which they cannot control – to interfere with their economic activities. They are, therefore, willing to trade the risks that arise from their daily conduct of business. Whether in industrial, commercial or financial businesses, the financial assets – loans, bonds, shares, stocks, derivatives – they trade allow them to hedge the risks that accumulate in their balance sheets in the course of business. From the point of view of the corporates and other firms trading in these risks has been also very much at the centre of financial developments.<sup>3</sup>

Investors' holdings of securities – or long positions in shares and stocks, bonds or loans – expose them to the sort of risks with which the securities are associated. Part of this risk stems from the unique features of the security, but part is related to more common characteristics shared across securities. Two common macroeconomic risks are those

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<sup>1</sup> See Cerra and Saxena (2008) and Kaminsky and Reinhart (1999) for measures of the economic costs of such crises.

<sup>2</sup> BIS (2007b).

<sup>3</sup> Modern courses in financial economics stress both functions of financial markets and intermediaries. See, for example, Kohn (2004) or Tirole (2006).

associated with the exchange rate and the interest rate risk in a given economy. These risks can often be traded separately (see below). Pooling securities together in portfolios takes advantages of the idiosyncratic nature of the risks they bear to reduce the overall risk that investors face. For example, including the shares of exporting companies and non-tradable services in an equity portfolio helps to reduce the overall risk of the portfolio to a fall in external demand. From the economy's point of view, portfolio pooling spreads risk across investors.

Opening portfolios to foreign securities offers a good opportunity to trade risks in financial markets. Cross-border trading in securities facilitates the exchange of the idiosyncratic risks embedded in them. The differences in economic structure and macroeconomic *fundamentals* across countries make the payoffs from foreign securities differ from the ones existing in the domestic economy. Lower price correlation between domestic and foreign securities provides opportunities for reducing risk in investors' portfolios.<sup>4</sup> From the point of view of the national economy, many of these risks are systemic in nature (eg they cannot be eliminated through portfolio diversification into domestic assets); they are intrinsic to the economy and are shared by most domestic securities. Improving risk-sharing between the national economy and the rest of the world can help in making the national economy more resilient to specific shocks that might hit from time to time.

Two cash markets typically help in the development of derivatives markets. The first is the foreign exchange market. Table 1 summarises developments in the FX market since 2001. Total trading in EME currencies has risen from \$98 billion in 2001 to \$246.9 billion in 2007. Daily trading in no fewer than 10 EME currencies now exceeds \$10 billion. One conclusion for BIS cross-country comparison is that as the volume of spot transactions rises, the share traded on the derivatives market relative to the spot market rises.

A second market is the local currency bond market. As documented more fully in CGFS (2007), local currency debt markets have developed in several EMEs over the past decade. Table A1 shows the development of domestic bonds outstanding: from just over \$1 trillion in 1998, the total outstanding now exceeds \$4 trillion. As issuance has become more market-oriented and secondary market trading has increased, yield curves have reached out in some countries. The development of such markets has helped the pricing of interest rate derivatives.

Hedging took a gigantic step forward with the development of derivative products in global financial markets. The growth in depth and breadth of these markets has made derivatives one of the most important instruments to trade risk in financial markets. In fact, a narrower definition of hedging associates it solely with the trade in risk that is carried out using derivatives.<sup>5</sup>

Derivatives are financial contracts that commit counterparties to exchange cash payments related to the value of a commodity or financial asset (underlying asset) with no actual delivery of the underlying asset (Kohn (2004)). They allow investors to deal with individual sources of risks, or a more limited set of risks than other financial assets. There are four main financial contracts: futures, forwards, swaps and options.<sup>6</sup> Futures are exchange-traded contracts for the sale or purchase of an asset at a future date. They are written over a large range of underlying assets such as commodities, foreign currency or interest rates. Forwards are also contracts that trade an underlying asset at a future date but differ from futures in that

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<sup>4</sup> The overall portfolio volatility tends to fall.

<sup>5</sup> See Kohn (2004).

<sup>6</sup> Forward contracts are a purchase/sale of an asset for delivery at a future date. However, they are often settled without physical delivery but with a final payment.

they are traded in OTC markets rather than on exchanges. A swap is a contract in which the parties agree to a stream of payments determined with reference to the price of an asset over time. In the case of all three contracts, payments are netted and settled in cash. Finally, options are contracts where one party buys/sells (for the payment of a fee) the counterparty the right to trade in the underlying asset.

Table 1

**Foreign exchange spot markets**

Daily average turnover – developing countries, in billions of US dollars

	2001	2004	2007
<b>Asia</b>		<b>100.5</b>	<b>181.9</b>
China	...	0.6	8.3
Hong Kong SAR	18.9	35.6	37.9
India	1.6	3.4	14.3
Indonesia	3.3	1.0	1.7
Korea	5.8	10.3	17.4
Malaysia	0.5	0.8	1.7
Philippines	0.5	0.3	1.1
Singapore	34.5	42.5	89.2
Taiwan, China	3.2	4.8	8.8
Thailand	0.6	1.1	1.4
<b>Latin America</b>		<b>16.3</b>	<b>14.6</b>
Argentina	...	0.7	1.1
Brazil	3.6	2.5	5.1
Chile	1.7	1.5	2.0
Colombia	0.3	0.6	1.3
Mexico	4.4	10.7	4.5
Peru	0.2	0.3	0.6
<b>Central Europe</b>	<b>5.4</b>	<b>3.6</b>	<b>6.0</b>
Czech Republic	0.8	0.9	1.4
Hungary	0.4	0.7	2.2
Poland	4.2	1.9	2.4
<b>Others</b>			
Israel	0.3	2.7	3.5
Russia	9.4	23.6	34.0
Saudi Arabia	1.2	1.3	2.7
South Africa	2.1	1.8	3.4
Turkey	0.4	0.2	0.8
<b>Total</b>	<b>98.0</b>	<b>151.1</b>	<b>246.9</b>

Sources: Various national sources, eg central banks, national statistical offices, securities registers.

Derivatives were almost non-existent 30 years ago, but since then they have been growing very rapidly. According to the Triennial Central Bank Survey of Foreign Exchange and Derivatives Activity (Triennial Survey), the notional amount outstanding of OTC derivatives reached \$516.4 trillion in June 2007.<sup>7, 8</sup> Since 1998, the notional amount outstanding has grown at an annual rate of 25%.<sup>9</sup> The Triennial Survey also shows that almost 75% of total derivatives are interest rate contracts, while foreign exchange and credit contracts have a market share of 10% each. The remaining contracts correspond to commodity- and equity-related derivatives.

Daily OTC derivatives market turnover in global markets averaged \$4,193 billion in April 2007.<sup>10</sup> The share of interest rate derivatives in total turnover was only 55%. Turnover data are available with greater disaggregation and can be of particular help in analysing the derivatives market in EMEs. The Triennial Survey is the main source of the figures used in this paper.

One question dealt with here is whether the need for hedging is driving the growth and deepening of derivative product markets in EMEs. In particular, we look into the issue of whether patterns that have been observed in global financial markets are present in EMEs. Finally, we ask what the implications of the growth in derivatives markets are for central bank policies.

## The derivatives market in EMEs

The size of the derivatives market in EMEs has grown. Table 2 indicates the growth in the average daily turnover in OTC derivatives trading between 2001 and 2007. In 2007 it reached \$516 billion, up 28% annually since 2004. By this metric, the OTC derivatives market in EMEs is about 12% of the global market.<sup>11</sup> Remsperger (2007) puts the size of the derivatives market turnover at one tenth of the global derivatives market.

These figures also show that hedging opportunities in EMEs are concentrated in foreign exchange risk. Contrary to what is observed in more mature markets, foreign exchange contracts make up more than 80% of OTC derivatives market trading in EMEs. That the need for hedging of foreign exchange risk is high in EMEs rests on good macroeconomic and financial grounds.

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<sup>7</sup> Notional amounts outstanding are not a good measure for the amount of risk traded. The low level and volatility of interest rates determines a reduced value of risk traded. Gross market values (the sum of the market value of all positions) were \$11 trillion as of June 2007. See BIS (2007b), Table C5 on page 21.

<sup>8</sup> The notional outstanding amount of exchange-traded derivatives stood at \$96 trillion.

<sup>9</sup> See BIS (2007b), page 20.

<sup>10</sup> This includes an estimate of \$193 billion in transactions that were not fully reported in the Triennial Survey.

<sup>11</sup> This calculation may overestimate the size of the OTC derivatives market in EMEs. The figures shown in Table 2 do not net out the transactions that might take place between residents in two emerging market economies. The total amount of the transactions between EMEs that have not been netted out is \$120 billion, so the overestimation could be as high as 23%. Daily average trading in OTC derivatives market in the world was \$4,004 billion in 2007.

Table 2

### Geographical distribution of reported OTC derivatives market activity<sup>1</sup>

Daily average turnover, in billions of US dollars

	Total			Foreign exchange <sup>2</sup>			Interest rate <sup>3</sup>		
	2001	2004	2007	2001	2004	2007	2001	2004	2007
<b>Emerging Asia</b>	<b>137</b>	<b>207</b>	<b>438</b>	<b>130</b>	<b>183</b>	<b>355</b>	<b>6</b>	<b>24</b>	<b>83</b>
China	...	...	1	...	...	1	...	...	...
Hong Kong SAR	52	82	160	49	70	143	3	11	17
India	2	4	27	2	3	24	0	1	3
Indonesia	1	1	1	1	1	1	0	0	0
Korea	4	11	23	4	10	18	0	1	5
Malaysia	1	1	2	1	1	2	0	0	0
Philippines	1	0	1	1	0	1	0	0	0
Singapore	73	100	210	69	91	153	3	9	57
Taiwan (China)	2	6	8	2	5	7	0	2	1
Thailand	1	2	5	1	2	5	0	0	0
<b>Latin America</b>	<b>8</b>	<b>9</b>	<b>18</b>	<b>7</b>	<b>7</b>	<b>15</b>	<b>0</b>	<b>2</b>	<b>3</b>
Argentina	...	...	0	...	...	0	...	...	...
Brazil	2	2	1	2	1	1	0	1	0
Chile	1	1	2	1	1	2	0	0	0
Colombia	0	0	1	0	0	1	0	...	0
Mexico	5	6	14	4	5	11	0	1	3
Peru	0	0	0	0	0	0	0	...	0
<b>Central Europe</b>	<b>5</b>	<b>10</b>	<b>19</b>	<b>4</b>	<b>8</b>	<b>16</b>	<b>1</b>	<b>2</b>	<b>5</b>
Czech Republic	1	2	4	1	1	4	0	1	1
Hungary	0	2	5	0	2	5	0	0	1
Poland <sup>4</sup>	4	6	10	3	5	7	1	1	3
Israel	0	2	5	0	2	5	0	...	...
Russia	0	6	16	0	6	16	0	...	...
Saudi Arabia	1	1	2	1	1	2	0	0	0
South Africa	8	11	15	8	8	11	1	3	4
Turkey	1	2	3	1	2	3	0	0	0
<b>Total</b>	<b>160</b>	<b>248</b>	<b>516</b>	<b>151</b>	<b>217</b>	<b>423</b>	<b>8</b>	<b>31</b>	<b>95</b>

<sup>1</sup> Adjusted for local double-counting ("net-gross"). <sup>2</sup> Including outright forwards and foreign exchange swaps.

<sup>3</sup> Single currency contracts only. <sup>4</sup> Revised for 2001.

Source: 2007 Triennial Central Bank Survey.

There are several reasons why foreign exchange risk has traditionally been a prominent source of market risk in financial markets in EMEs. First, macroeconomic instability and external vulnerabilities have caused EMEs to suffer a disproportionate number of episodes of balance of payment crises. Successes in economic stabilisation and the reduction of

vulnerabilities have recently lowered the probability of such a crisis.<sup>12</sup> Second, structural reforms and trade liberalisation have contributed to trade and financial integration, and exchange rate volatility has gained importance in determining market risk.<sup>13</sup> Third, foreign exchange controls – and capital controls – have lost relative importance although they still remain in place in several economies. Fourth, governments have drifted away from fixed exchange rates, allowing for a more flexible exchange rate regime.

There are also financial grounds for foreign exchange risk being of particular concern in EMEs. Financial assets issued by EMEs have become part of international investors' portfolios. Since 2002 pension funds in the United States and other advanced economies have sought to increase their investments abroad and many EMEs have been the main beneficiaries.

Table 3, for example, shows the changes observed in the balance sheet of a large pension fund in the United States. The exposure to foreign securities has risen fast, and investments in EMEs have been the main source of the added exposure: between 2006 and 2007, almost 90% of the increased exposure to foreign securities was in EME currencies. More generally, investments from equity and bond funds in advanced economies also recorded increased allocations to bonds and equities issued by EMEs.

Table 3  
**California employees pension fund (CalPERS)**  
In billions of US dollars

	2000	2003	2006	2007 <sup>1</sup>
<b>Total assets</b>	<b>172.2</b>	<b>144.8</b>	<b>208.2</b>	<b>247.7</b>
Foreign securities	...	...	52.0	59.8
Equity	26.9	27.6	44.2	52.6
Bonds	...	...	5.5	7.2
Emerging market currencies				6.2
Hong Kong dollar				1.0
Korean won				1.0
Taiwan dollar				0.8
South African rand				0.6
Brazilian real				0.5
Singapore dollar				0.4
Mexican peso				0.3
Indian rupee				0.3

<sup>1</sup> At 30 September.

Source: CalPERS financial statements.

<sup>12</sup> See Rossini et al (2008) for how political uncertainty affects the volatility in the forward market.

<sup>13</sup> Until 2002, the domestic futures and options markets in Argentina were basically limited to agricultural commodities. However, the abandonment of the currency board in 2002 and the adoption of a flexible exchange and monetary system required instruments for hedging against risks (Central Bank of Argentina (2008)).

The growing investment of foreign investors in EME financial markets provides another reason for concern about FX risk in EME currencies.<sup>14</sup> Buying foreign securities denominated in local currency brings new risks to the purchasers. The volatility of returns on the new securities is generally higher and depends in part on changes in the exchange rate. Investors might like to shy away from some of these risks, and derivatives are a useful tool for this purpose. Overlay currency strategies provide an example. This investment strategy seeks to manage the exchange rate risk in an investment portfolio through the creation of a synthetic portfolio made up of FX derivatives. This strategy was developed in the second half of the 1990s to deal with the growing exchange rate risk exposure of large US pension funds. During the 1980s, pension funds in the United States started to overtake other market participants in asset growth, and their returns became more correlated with the market. In response to this implied increase in the market risk of their domestic portfolio, many pension funds sought to diversify through investment in EME liabilities denominated in domestic currency.

There is also a presumption that trading in derivatives markets in EMEs might rise in response to increased demand from residents. Financial market deepening and wealth creation are pushing greater financial integration and residents of EMEs are broadening their portfolio holdings of foreign securities. Desormeaux et al (2008) describe how the growth in pension funds has offered opportunities for the deepening of the OTC derivatives market in Chile.<sup>15</sup>

Dealers and other financial institutions account for the largest share of the OTC derivatives markets in EMEs. In particular, cross-border trading between dealers has a clear dominant position in OTC derivatives markets in central and eastern European economies, Hong Kong SAR and Singapore, as well as Taiwan (China), Mexico and South Africa.<sup>16</sup>

The non-financial corporate sector has a relatively greater share of more complex and long-lived FX derivatives. There are many opportunities for the use of FX derivatives to increase among the corporate non-financial sector in many EMEs. However, even in advanced economies the corporate non-financial sector does not hedge a great deal of the risks in their balance sheet in the derivatives market.

The local derivatives market for foreign exchange risk is also affected by the amount of trading that takes place in the local currency in offshore markets. The volume of trading in EME currencies in world markets exceeds the local trading in the case of many countries. The channels of communication between onshore and offshore derivatives markets are very fluid. In the absence of capital controls, arbitrage leads to efficiency in pricing with similar prices in both markets. In a sense, onshore and offshore markets can complement each other in accommodating the changes in demand and supply for hedge.

Interest derivatives are not as well known in EMEs. These contracts in the global derivatives market have a share roughly similar to that of FX derivative products.<sup>17</sup> In contrast, the market share of OTC interest rate contracts in EMEs is just 18%. Remsperger (2007) also makes this point. There seem to be only two large economies among EMEs – Brazil and Korea – where exchange-traded derivatives, especially interest rate or government bond futures, have a dominant position in the derivatives markets (CGFS (2007)).

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<sup>14</sup> The presence of foreigners helps in the development of derivatives market, as in the case of Poland (see Pruski and Szpunar (2008)).

<sup>15</sup> On the issue of pension funds in EMEs, see the accompanying note “Pension systems in EMEs: implications for capital flows and financial asset markets”.

<sup>16</sup> See BIS (2007b), Table E27.

<sup>17</sup> See BIS (2007b), Table C1.

## Hedging foreign exchange risk in EMEs

Foreign exchange hedging opportunities have grown pari passu with the increased demand. The pace of change has not been uniform across EMEs, with markets developing faster in some economies than others. Table 2 shows that Hong Kong SAR and Singapore have the lion's share – about 60% – of OTC FX derivatives activity in EMEs. The next five economies – India, Korea, Mexico, Russia and South Africa – have a combined share of only 15%.

Table 4  
**Foreign exchange turnover<sup>1</sup>**  
 Daily average turnover in April 2007, in billions of US dollars

	Spot	OTC derivatives turnover				
		Total	Outright forwards	FX swaps	Currency swaps	Options
<b>Emerging Asia</b>						
China	8.3	0.9	0.0	0.9	0.0	0.0
Hong Kong SAR	37.9	143.0	14.7	122.0	0.6	5.7
India	14.3	24.0	6.3	13.4	0.5	3.8
Indonesia	1.7	1.4	0.5	0.6	0.1	0.1
Korea	17.4	17.8	5.1	10.8	1.2	0.6
Malaysia	1.7	1.8	0.4	1.4	0.0	0.0
Philippines	1.1	1.3	0.2	1.0	0.0	0.0
Singapore	89.2	152.5	25.2	116.1	1.2	10.1
Taiwan (China)	8.8	6.7	1.7	4.0	0.1	0.9
Thailand	1.4	4.9	0.7	4.1	0.1	0.0
<b>Latin America</b>						
Argentina	1.1	0.0	0.0	0.0	0.0	0.0
Brazil	5.1	0.7	0.3	0.0	0.3	0.0
Chile	2.0	2.0	1.5	0.4	0.0	0.0
Colombia	1.3	0.6	0.5	0.1	0.0	0.0
Mexico	4.5	10.8	0.4	10.2	0.0	0.1
Peru	0.6	0.2	0.2	0.0	0.0	0.0
<b>Central Europe</b>						
Czech Republic	1.4	3.6	0.9	2.7	0.0	0.1
Hungary	2.2	4.7	0.2	4.3	0.0	0.1
Poland <sup>4</sup>	2.4	6.8	0.5	5.9	0.1	0.3
Israel	3.5	4.8	0.0	4.4	0.0	0.4
Russia	34.0	16.2	1.1	15.1	0.0	0.0
Saudi Arabia	2.7	1.8	0.1	1.3	0.3	0.1
South Africa	3.4	10.6	0.9	9.5	0.0	0.1
Turkey	0.8	3.3	0.7	1.9	0.6	0.2
<b>Total</b>	<b>247.0</b>	<b>420.4</b>	<b>62.2</b>	<b>330.3</b>	<b>5.1</b>	<b>22.8</b>

<sup>1</sup> Adjusted for local inter-dealer double-counting (ie "net-gross" basis). Data may differ slightly from national survey data owing to differences in aggregation procedures and rounding.

Source: 2007 Triennial Central Bank Survey.



FX derivatives markets have developed faster in economies where the spot market has gained depth (Table 4) and where pricing is more efficient. Singapore and Hong Kong have particularly large and liquid spot markets. Spot markets have expanded rapidly in several EMEs. In the last three years, trading in EME currencies in the spot market grew at almost 18% annually. Trading in spot markets grew even faster in countries with relatively deep spot markets, such as in Singapore (28% annual), India (61%), Hungary (47%) and Brazil (25%), and among countries with shallower markets, like China (139%) and the Philippines (47%).

Efficient spot markets are indispensable for market-makers and financial intermediaries that wish to hedge exposures arising from their activities in the derivatives market. In efficient FX spot markets, market demand and supply for foreign exchange determine market dynamics. Market failures due to the exercise of monopoly power or government interference can not only alter market dynamics but can hinder the development of spot and derivatives markets as well.

Two other trends should be noted. First, the banking sector is the biggest user of OTC derivatives and keeps the largest open position in most EMEs. Its net position is generally concentrated in foreign exchange swaps, the most significant OTC derivative product in EMEs. Second, other OTC FX derivatives are beginning to develop in response to increased demand from other sectors in the economy.

### ***The central role of foreign exchange swaps***

Foreign exchange swaps dominate the OTC derivatives market in EMEs. Their market share in many EMEs is extremely high: 80% or more of the average daily transactions. FX swaps dominate the OTC derivatives market in Hong Kong, Hungary, Mexico, Poland, Singapore and South Africa, all countries that have a high level of financial integration. Foreign banks and other foreign financial intermediaries have a relatively large market share in financial markets in these jurisdictions.

One explanation for pre-eminence of the foreign exchange swap in the EME derivatives market is its widespread use for funding financial market operations in the domestic financial market instead of the money market. Because many foreign investors do not have access to the money market, they obtain the local currency through a foreign exchange swap. The high proportion of foreign exchange swaps that are written cross-border and at a maturity of one week or less supports this assertion.<sup>18</sup>

There are a few implications from this market development. First, the spot sale of FX and the simultaneous FX forward purchase suggest that financial inflows are hedged. Perhaps “carry trades” are less common than sometimes thought. It is also unlikely that changes in the exchange rate are due to changes in the “technical position” or the dynamics of the foreign exchange markets. This does not preclude the possibility that shocks to the exchange rate have implications for the economy.

Second, foreign exchange swaps are a cost-efficient way to fund financial market operations across jurisdictions. To keep a balance sheet in different jurisdictions that grants access to the money market/interbank market raises the cost of trading. In bond and credit markets where margins are relatively narrow, this can have a big impact. Even if a financial institution keeps a balance sheet in a jurisdiction, there is an agency problem arising from the decentralised managerial structure of international banks’ business that the foreign currency swap helps to overcome. The manager of the local balance sheet would like to charge the marginal cost of funding to the unit carrying out the investment. The internal trading unit

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<sup>18</sup> See BIS (2007), Tables E20 and Table C1.

carrying out the investment might get a cheaper funding in another jurisdiction or even locally.

### ***Other OTC FX derivatives***

Forwards are important in several EMEs and available in many more. They are sometimes considered not to be a derivative instrument because settlement might involve the actual delivery of the foreign exchange. Indeed, it is most often the case that the transaction is settled in cash. The main reason is that market participants seek to hedge market risk through the forward contract – eg the risk that the exchange rate fluctuates – without increasing their exposure to credit risk (eg counterparty risk).

Forwards have a dominant market position in Korea and Taiwan. In Korea, a very deep market for interest rates futures contracts (see more below) provides an important vehicle for investing or a source of funding for investors in the domestic financial markets. CGFS (2007) found that investors might prefer to gain exposure to interest rates because of taxation considerations. In the case of foreign investors, the outright forwards provide a hedge for part or even the whole of their exchange rate risk. Forward markets are liquid in only a handful of jurisdictions, eg India, Hong Kong, Singapore, Chile; Russia and South Africa. Most trading activity takes place cross-border between banks and other financial institutions. Contracts with a maturity of up to one year but not less than seven days have the largest market share, well ahead of any other segment.<sup>19</sup>

Currency swaps have a small market share in the OTC FX derivatives market in EMEs.<sup>20</sup> The figures available show that they are generally traded between two dealers or financial institutions in cross-border deals.<sup>21</sup> One reason may be that FX swaps offer a superior solution to the hedging needs of market participants. In India, a country where the product has a relatively high share in the OTC derivatives market, a large share of currency swaps are undertaken on behalf of the corporate sector. Other countries with relatively high trading volumes are Korea and, to some extent, Brazil. In general, these are jurisdictions where the banking sector is relatively large and investors face some regulatory hurdles in gaining access to the foreign exchange market.

FX options have relatively large trading volumes in Singapore, Hong Kong and India.<sup>22</sup> In Singapore it is a relatively concentrated market, made up predominantly of market dealers; about half of their trades are cross-border. In Hong Kong and India, the volume of FX options traded is about half those in Singapore, and a larger percentage is traded with non-financial customers in the country. There is also a relatively large volume traded cross-border between market-makers. India is also a jurisdiction with a high turnover in FX options, most of it to satisfy the demands of non-financial customers.

### ***Offshore and onshore trading in FX derivatives***

Hedging opportunities for exchange rate risk are not restricted to domestic derivatives markets. Table 5 shows an estimate of the offshore OTC FX derivatives trading in EME currencies. A strikingly large share of transactions does not involve a counterparty in the

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<sup>19</sup> See BIS (2007), Table E20.

<sup>20</sup> The currency swap should not be confused with a foreign exchange swap. Currency swaps are contracts where the parties exchange payments over a period of years in two different currencies. They are cross-market trades: the interest rates are those that prevail in the money market of each currency. Foreign exchange swaps are a combination of spot and forward transactions in the same currency market.

<sup>21</sup> See BIS (2007), Table E28.

<sup>22</sup> See BIS (2007), Table E29.

domestic market. Offshore trading is concentrated in the forward market and in options. For forwards, this reflects the well developed offshore non-deliverable forward (NDF) market (CGFS (2007)). The offshore market in options is a by-product of the relative sophistication of such products – they are relatively complex to use – as well as the “niche” character of those providing the supply.

Table 5

**OTC foreign exchange derivatives turnover by currency offshore ratio<sup>1</sup>**

Daily average in April 2007, in billions of US dollars

	<b>Total</b>	<b>Outright forwards</b>	<b>FX swaps</b>	<b>Currency swaps</b>	<b>Options</b>
<b>Emerging Asia</b>					
Chinese renminbi	84.4	99.1	16.4	...	...
Hong Kong dollar	9.1	65.0	...	38.3	86.5
Indian rupee	29.8	59.3	2.6	3.5	34.9
Indonesian rupiah	53.9	75.1	13.0	31.1	49.5
Korean won	33.9	49.9	3.1	10.5	80.2
Malaysian ringgit	44.6	77.5	1.8	0.0	87.8
Philippine peso	46.2	82.9	5.5	12.4	92.5
Singapore dollar	41.9	72.6	38.6	72.9	33.9
New Taiwan dollar	63.6	81.4	9.1	16.3	61.3
Thai baht	25.7	28.2	25.2	4.0	41.5
<b>Latin America</b>					
Argentine peso	49.3	29.5	...	...	...
Brazilian real	92.5	95.5	91.7	13.1	97.7
Chilean peso	...	...	0.3	...	98.5
Colombian peso	...	...	...	...	15.1
Mexican peso	62.7	91.5	48.7	95.4	97.0
Peruvian new sol	...	...	...	...	...
<b>Central Europe</b>					
Czech koruna	49.0	45.8	48.3	79.3	76.7
Hungarian forint	47.5	91.5	31.9	99.5	75.8
Polish zloty	74.0	82.7	73.0	66.9	67.5
Israeli new shekel	8.9	...	9.7	...	0.4
Russian rouble	8.5	19.3	5.0	...	85.5
Saudi riyal	3.8	59.4	1.6	...	...
South African rand	66.0	79.2	61.1	92.8	95.2
Turkish lira	25.7	9.3	13.7	...	83.4
<b>Total</b>	<b>39.8</b>	<b>71.6</b>	<b>26.0</b>	<b>28.4</b>	<b>77.8</b>

<sup>1</sup> OTC foreign exchange derivatives turnover in any country minus turnover in the country of the currency as a percentage of the total in any country.

Source: 2007 Triennial Central Bank Survey.

Two points about offshore derivatives markets deserve mention. First, there is a high degree of communication between the domestic and offshore markets in many economies. Some participants in the global NDF market keep close ties with participants in the domestic

forward market. As pointed out in the analysis of the domestic forward market above, cross-border trades represent a large proportion of all trades in the domestic forward market (see section on “Other OTC FX derivatives”). Second, the NDF market distributes its hedging products to global investors. This may involve some leverage of positions to the extent that participants in offshore market keep open positions. The nature of the final demand for NDF is important in this regard. Some observers fear that the availability of derivatives markets increases opportunities for speculation against emerging market currencies (Dodd (2001)). However, as has already been shown, the holdings of EME securities in international investors’ portfolios have grown and are the source of an increased demand for FX hedging instruments.

The examples of Hong Kong and Singapore also indicate that the development of the derivatives markets does not mean that such markets will be restricted to advanced economies. Moreover, there is a significant share of transactions in both places that does not involve trading in domestic financial assets. In Singapore, less than one tenth of FX transactions involve the local currency. In Hong Kong, about half of the FX transactions involve the local currency. Some of the trading in other currencies also involves other EM currencies.

### **Hedging interest rate risk**

The OTC derivatives market for hedging interest risk is rather underdeveloped in EMEs (Table 6) and is concentrated predominantly in interest rate swaps. Interest rate swaps are contracts whereby the counterparties agree to exchange payments of interest that are determined by two different interest rates, usually one fixed and another floating. Another interest rate derivative is the forward rate agreement (FRA). In an FRA, the parties to the contract agree to an interest rate for payments in the future. These products are ideal for managing interest rate risk arising from business. Financial intermediaries are their main users.

Interest rate derivatives have expanded over the years, but remain notably small. One explanation is that interest rate risk is still relatively low in EMEs. Financial markets have grown but remain relatively small in terms of the size of the overall economy. Moreover, interest rate risk remains with the banking sector, the main lender in EMEs, which can easily manage interest rate risk in its funding needs. Another possible explanation resides in the level of real interest rates: while nominal interest rates have fallen sharply in EMEs, real interest rates are comparatively high but also less volatile. In this way, they may compensate financial intermediaries for the high-risk stake.

Trading volumes are very low in most currencies, with the exceptions of contracts denominated in the Hong Kong dollar and the Mexican peso.<sup>23</sup> Instruments denominated in the Korean won, Indian rupee and Singapore dollar have a somewhat high trading volume, but still less than the previous two markets. While interest rate swaps dominate the derivatives market in most of these economies, the FRA is the dominant instrument for interest rate hedging in central European economies.

The OTC interest rate swap stronghold in the Korean won is worth mentioning. Korea has successfully developed an exchange-traded 10-year government bond future contract. More recently, a future on a short-maturity bond has started trading. It is clear that the banking sector has been the main player in the government bond futures market and has made use

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<sup>23</sup> Virtually non-existent in the late 1990s, exposure to Mexican interest rates is now possible, with liquid swaps up to 10 years and transactions up to 20 years becoming more common. Many foreign participants favour this market because of its high liquidity and flexibility (Bank of Mexico, 2008).

of its competitive advantage. It trades most swap contracts cross-border at maturities of less than one year.

Table 6

**Reported interest rate turnover in  
OTC derivatives markets by currency<sup>1</sup>**

Daily average in April, in billions of US dollars

	Total			Of which					
				FRAs			Swaps		
	April 2001	April 2004	April 2007	April 2001	April 2004	April 2007	April 2001	April 2004	April 2007
<b>Emerging Asia</b>	<b>1.86</b>	<b>8.23</b>	<b>22.93</b>	<b>0.47</b>	<b>1.12</b>	<b>0.65</b>	<b>1.38</b>	<b>6.50</b>	<b>19.57</b>
Chinese renminbi	...	...	0.18	...	...	–	...	...	0.15
Hong Kong dollar	1.45	4.35	9.19	0.42	0.07	0.05	1.03	3.82	8.78
Indian rupee	0.03	0.42	3.49	0.00	0.02	–	0.03	0.40	3.33
Indonesian rupiah	0.00	0.01	0.02	...	0.00	–	0.00	0.01	0.02
Korean won	0.04	0.34	4.80	...	...	0.25	0.04	0.30	3.94
Malaysian ringgit	0.00	0.03	0.27	0.00	...	–	0.00	0.03	0.17
Philippine peso	...	0.00	0.00	...	...	–	...	0.00	0.00
Singapore dollar	0.32	2.68	3.69	0.05	1.02	0.35	0.27	1.59	2.29
New Taiwan dollar	0.02	0.40	1.28	0.00	...	–	0.02	0.35	0.89
<b>Latin America</b>	<b>0.43</b>	<b>2.61</b>	<b>7.06</b>	<b>0.17</b>	<b>0.71</b>	<b>0.16</b>	<b>0.25</b>	<b>1.90</b>	<b>6.38</b>
Argentine peso	...	...	–	...	...	–	...	...	–
Brazilian real	0.18	0.85	1.75	0.01	0.11	–	0.15	0.74	1.74
Chilean peso	...	...	0.00	...	...	–	...	...	0.00
Colombian peso	...	...	0.00	...	...	0.00	...	...	0.00
Mexican peso	0.26	1.76	5.31	0.16	0.61	0.16	0.09	1.16	4.63
Peruvian new sol	...	...	0.00	...	...	0.00	...	...	0.00
<b>Central Europe</b>	<b>0.35</b>	<b>0.97</b>	<b>3.64</b>	<b>0.30</b>	<b>0.73</b>	<b>2.22</b>	<b>0.05</b>	<b>0.23</b>	<b>1.41</b>
Czech koruna	0.10	0.24	0.56	0.07	0.23	0.39	0.03	0.01	0.17
Hungarian forint	0.00	0.10	1.22	0.00	0.06	0.89	...	0.04	0.33
Polish zloty	0.25	0.63	1.85	0.23	0.45	0.94	0.02	0.18	0.90
Israeli new shekel	...	...	0.00	...	...	–	...	...	0.00
Russian rouble	...	...	0.02	...	...	–	...	...	0.02
Saudi riyal	0.03	0.02	0.04	0.00	0.00	0.00	0.03	0.01	0.04
South African rand	0.40	1.56	1.66	0.32	1.08	0.74	0.07	0.42	0.27
Turkish lira	...	...	0.04	...	...	–	...	...	0.00
<b>Total</b>	<b>3.08</b>	<b>13.39</b>	<b>35.40</b>	<b>1.26</b>	<b>3.65</b>	<b>3.77</b>	<b>1.78</b>	<b>9.06</b>	<b>27.69</b>

<sup>1</sup> Adjusted for local and cross-border double-counting. Single currency contracts only.

Source: 2007 Triennial Central Bank Survey.

## Hedging credit risk

Several products are available for investors to manage their exposure to credit risk in EMEs.<sup>24</sup> Credit default swaps (CDS) are the most prominent financial products for the purpose of managing credit risk in EMEs (see Dages et al (2005)). In part, this reflects a global trend in financial markets: the CDS market has been one of the fastest growing global financial markets in recent years. According to the Triennial Survey, CDS made up 88% of the credit derivatives in global positions of OTC markets as of June 2007, and had been the fastest growing segment of the credit derivatives market (BIS 2007b). The notional value of global OTC credit derivatives positions was then \$51 trillion, up from \$4.5 trillion at the time of the previous survey in 2004. CDS in global markets are also concentrated in single names.

In a credit default swap, the seller commits herself to repay an obligation (eg bond) underlying the contract at par in the event of a default. For producing this guarantee, a regular premium is paid by the buyer. The simple structure and flexible conditions of the CDS contract make it an efficient financial instrument for managing credit risk. This also explains, in part, its rapid growth and pre-eminent position in the global capital markets. The contract flexibility is based on several features. First, the contract structure allows any obligation with a certain cash flow to be used as the underlying asset. This is usually defined as the referenced entity and can encompass loans or bonds issued by corporations, financial institutions or governments (usually referred to as sovereigns); it can also extend to a portfolio of referenced entities. In the latter case, the buyer can seek cover against any combination of default events or loss-given-default that he might want to avoid.

Single-name CDS account for about three fifths of the global positions in the market. While most CDS have been arranged on corporate entities in global capital markets, the market value issued out of EMEs is concentrated in sovereign entities (Packer and Suthiphongchai (2003)).<sup>25</sup> Consistent with the predominant share of corporate entities in CDS markets in the global financial markets, the average maturity of CDS is five years (not far from the most frequent duration for corporate bonds). In the case of EMEs, the most liquid tranche of the market is around five years, but there is also a market up to 10 years.

Four crucial characteristics of the contract are its legal structure, settlement, liquidity and valuation. The legal structure involves two issues: legal framework and event definition. The CDS market in EMEs is structured on global/international bonds and is not written with reference to domestic bonds. Therefore, the legal provisions are in general alien to the legal systems of EMEs. The second legal issue is the definition of a default event. When such an event occurs, the seller buys the bond at par and the buyer stops making payments. An important issue has been the development of standard documentation, which has helped to deepen the market<sup>26</sup> and has also been important in defining a credit event. Until 2002, credit events comprised: (i) bankruptcy, (ii) obligation acceleration, (iii) obligation default, (iv) failure to pay, (v) repudiation or moratorium and (vi) restructuring. Owing to the Argentine government's protracted credit deterioration in 2001, which included two attempts to restructure its outstanding debt, restructuring was eliminated as a trigger for the contract. Since then, a "credit event" has been considered to be related solely to a lack of service of the debt. It is often argued that the relatively smooth settlement of contracts in the wake of

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<sup>24</sup> Firms might also seek to unload some components of the economic risks, in particular those associated with their counterparties failing or government action that might cause economic losses related to their operations in EMEs. However, this section will concentrate on the case of financial investors.

<sup>25</sup> Packer and Suthiphongchai (2003) also note that many CDS in EMEs are issued on obligations from quasi-sovereign entities such as state owned companies or financial institutions.

<sup>26</sup> The standard contract is produced by the International Swaps and Derivatives Association. See [www.isda.org](http://www.isda.org).

the Argentine government debt default raised the standing of the CDS as an adequate way of managing risk exposures in EMEs.

Settlement is conceptually a straightforward operation in any CDS. Yet, given the reality of a multibillion OTC market, a few cases have arisen of a bilateral fast build-up in exposures. In exchange-traded contracts, margins limit leverage and overall exposures. There have been attempts to try to introduce netting between market-makers in OTC markets, and to mitigate the problem by having meetings between market-makers to exchange information. Ledrut and Upper (2007) provide a summary of these initiatives. Indeed, the relative concentration of the market in the hands of a few dealers might be motivated by the difficulties in keeping such exposures under control.

The issue of valuation is related to the previous point. OTC markets permit market-makers to tailor contracts to clients' needs. In doing so, contract heterogeneity becomes greater due to heterogeneity in demand. In the case of CDS contracts, the main issue is the bond incorporated in the contract. In general, issuers can keep different bonds outstanding and the option to fulfil the contract with any bond ("cheapest to deliver") which contributes to the liquidity of derivative products.

## Conclusions

This note has examined the development of hedging instruments in EMEs over the last decade. Of all such markets, the FX derivatives market is the most important and most developed in EMEs. The demand for hedging in the FX market is driven by investors' desire to invest in emerging market bonds and equities. FX derivatives markets are most developed in countries with deep and efficient spot markets (eg Hong Kong and Singapore). However, they have also developed in some other EMEs (namely Brazil, India, Korea, Mexico, Russia and South Africa). The banking sector is the biggest user of OTC derivatives in EMEs. Among FX derivatives, FX swaps dominate the OTC derivatives market in EMEs as they enable foreign investors to access the local money market. FX forwards are dominant in Korea and Taiwan and are fairly liquid in a few other EMEs (eg Chile, Hong Kong, India, Russia, Singapore and South Africa). Currency swaps constitute a very small share of FX derivatives and are traded mainly in Brazil and Korea. FX options have relatively large trading volumes in Hong Kong, India and Singapore. Offshore trading of many EME currencies is quite significant, with NDFs and options being the main hedging instruments traded in this way.

While the FX derivatives market is quite developed in EMEs, the OTC derivatives market for hedging interest rate risk is rather underdeveloped and mostly concentrated in interest rate swaps. Some reasons for their underdevelopment may include the low level of interest rate risk, which in any event mostly resides with the banking sector and can be handled in other ways. CDS provide a hedge against credit risk, but for EMEs they are mostly concentrated on sovereign entities instead of corporations.

The benefits of hedging exchange rate risks with derivative products come at the price of some risks. In the absence of derivatives markets, speculative attacks channelled through the spot markets can be resisted by the central banks, provided they have sufficient reserves and a banking sector strong enough to withstand high interest rates. However, with derivatives markets, speculators can take virtually unlimited positions in forward and swap markets and reduce the effectiveness of central bank's intervention (Dodd (2001)). Furthermore, as markets become one-sided, dynamic hedging in the derivatives market can amplify market movements. Authorities should bear these risks in mind, even while fostering the development of the derivatives market (Chan-Lau (2005)).

## Annex I

Table A1

### Domestic bonds and notes

Amounts outstanding – developing countries, in billions of US dollars

	1998	2000	2006	2007 Q3
<b>Latin America</b>	<b>228.1</b>	<b>260.8</b>	<b>521.4</b>	<b>660.4</b>
Argentina	36.7	41.9	63.7	62.3
Brazil	111.8	89.6	157.1	261.7
Chile	32.3	32.1	35.8	39.6
Colombia	2.1	4.6	6.4	6.8
Mexico	42.4	80.2	242.9	271.1
Peru	2.6	5.8	10.5	14.3
Venezuela	0.3	6.6	5.1	4.6
<b>Asia</b>	<b>679.0</b>	<b>957.4</b>	<b>2,508.3</b>	<b>2,926.2</b>
China	125.1	202.3	735.8	945.4
Hong Kong SAR	10.7	14.7	24.9	26.3
India	80.8	107.9	282.8	359.8
Indonesia	1.8	47.3	53.1	60.7
Malaysia	41.4	64.0	116.4	128.5
Pakistan	14.9	14.8	19.4	20.8
Philippines	10.5	11.5	31.4	36.2
Singapore	18.7	25.5	49.2	55.3
South Korea	299.7	371.3	924.2	999.8
Taiwan, China	51.5	68.7	167.6	167.4
Thailand	23.8	29.4	103.6	125.9
<b>Central Europe</b>	<b>43.8</b>	<b>54.2</b>	<b>225.9</b>	<b>261.0</b>
Croatia	2.1	1.9	6.3	7.2
Czech Republic	5.8	7.1	42.0	50.9
Hungary	12.7	13.6	50.0	58.3
Poland	20.7	29.6	114.3	129.3
Slovakia	2.5	2.0	13.3	15.4
<b>Others</b>	<b>93.8</b>	<b>114.8</b>	<b>304.9</b>	<b>354.0</b>
Russia	7.5	7.7	33.3	41.4
South Africa	67.4	55.5	97.2	101.3
Turkey	19.0	51.6	174.4	211.4
<b>Total</b>	<b>1,044.7</b>	<b>1,387.2</b>	<b>3,560.6</b>	<b>4,201.7</b>

Sources: Various national sources, eg central banks, national statistical offices, securities registers.



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